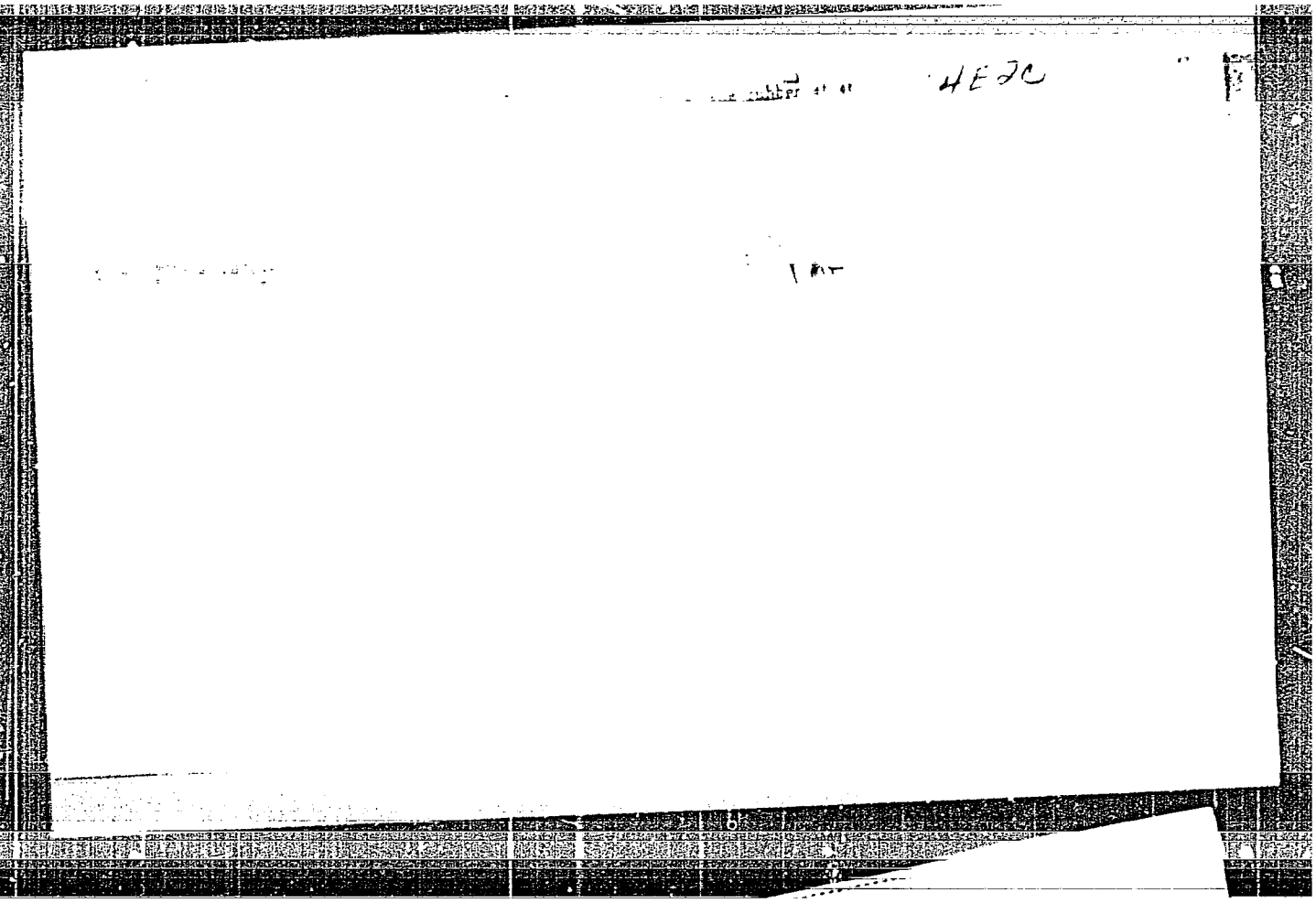


YAKUBCHIK, A. I.

Category: USSR / Physical Chemistry - Kinetics. Combustion. Explosives. B-9
Topochemistry. Catalysis.

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 30066

Author : Yakubchik A. I., Gromova G. N.
Inst : not given
Title : Hydrogenation of Divinyl Rubber Solutions at Atmospheric Pressure and Room Temperature. II. Effect of the Nature of the Solvent on Process of Catalytic Hydrogenation of an Unsaturated Compound over a Palladium on Calcium Carbonate Catalyst.

Orig Pub: Zh. obshch. khimii, 1956, 26, No 6, 1626-1628

Abstract: Hydrogenation of ally. alcohol (I) over a Pd/CaCO catalyst (C) was used to elucidate the effect of the nature of the solvent on rate and extent of hydrogenation. In C_2H_5OH and n-C_4H_9OH, (II) I is hydrogenated to the extent of 87%, in iso-C_4H_9OH to 52%, in 2,2-dimethyl-dioxane-1,5 (III) to 65%, in $(C_2H_5)_2O$ to 95%, in benzene no hydrogenation takes place. Hydrogenation of divinyl

-28-

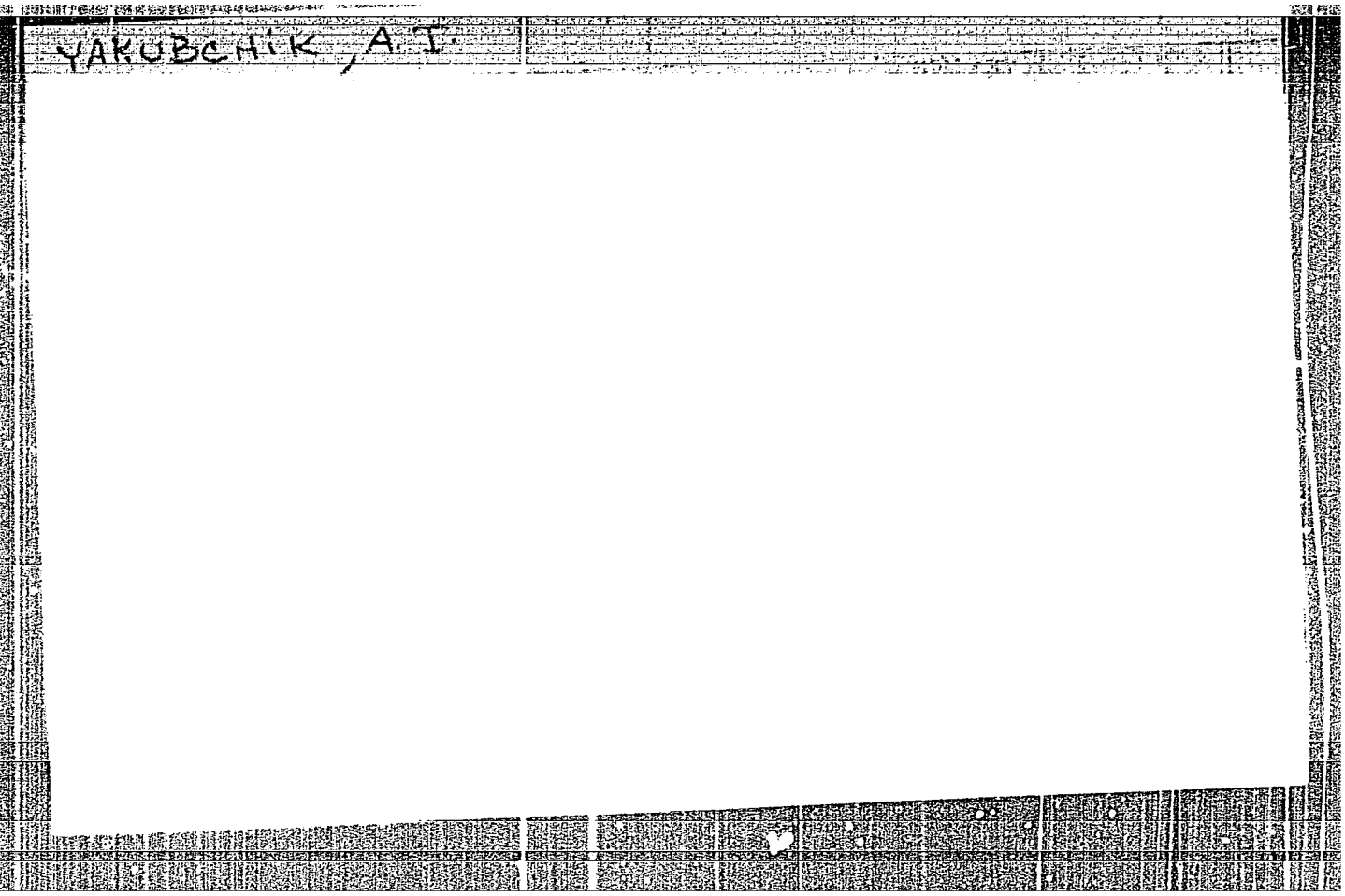
Card : 1/2

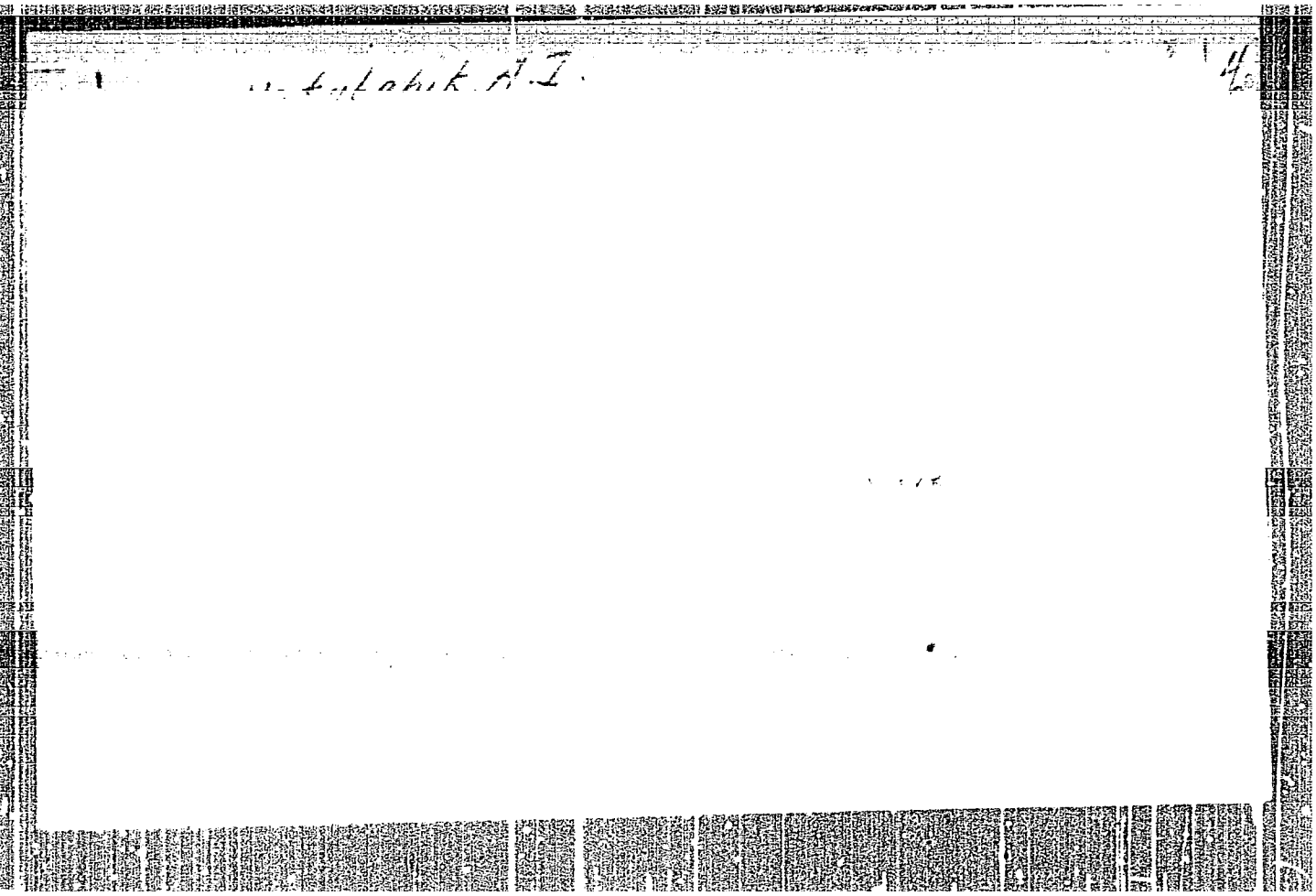
Category: USSR / Physical Chemistry - Kinetics. Combustion. Explosives. Topochemistry. Catalysis B-9

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 3066

rubber (IV) was carried out over a C in solution of III, and samples of hydrogenated rubber (V) insoluble in III were obtained. Properties of V, obtained over a C in III, are analogous to properties of V previously obtained, with the same C, in II. Selective hydrogenation of external double bonds of IV on hydrogenation in III is more clearly manifested than on hydrogenation in II. Part I, see RZhKhim, 1957, 27071.

Card : 2/2 -29-





Yakubchik, A.I.

USSR/ Analytical Chemistry. Analysis of Organic Substances. G-3

Abs Jour: Referat. Zhur.-Khimiya, No. 8, 1957, 27260.

Author : A.I. Yakubchik, S.K. Zykova.

Title : Application of Distributive Chromatography to Separation of Acids Formed at Oxidation Decomposition of Ozonides of Divinyl Polymers.

Orig Pub: Zh. prikl. khimii, 1956, 29, No. 10, 1591 - 1597.

Abstract: The applicability of the method of distributive chromatography to the separation of products of oxidation decomposition of ozonides of divinyl rubbers is demonstrated by the examples of succinic acid, CH_2COOH, HCOOH, 1,2,4-butanetricarboxylic acid, 1,2,3-propanetricarboxylic acid and 1,2,4,6-hexanetetracarboxylic acid. The silica gel MSK VKhK (mesh 170 to 200 or 100 to

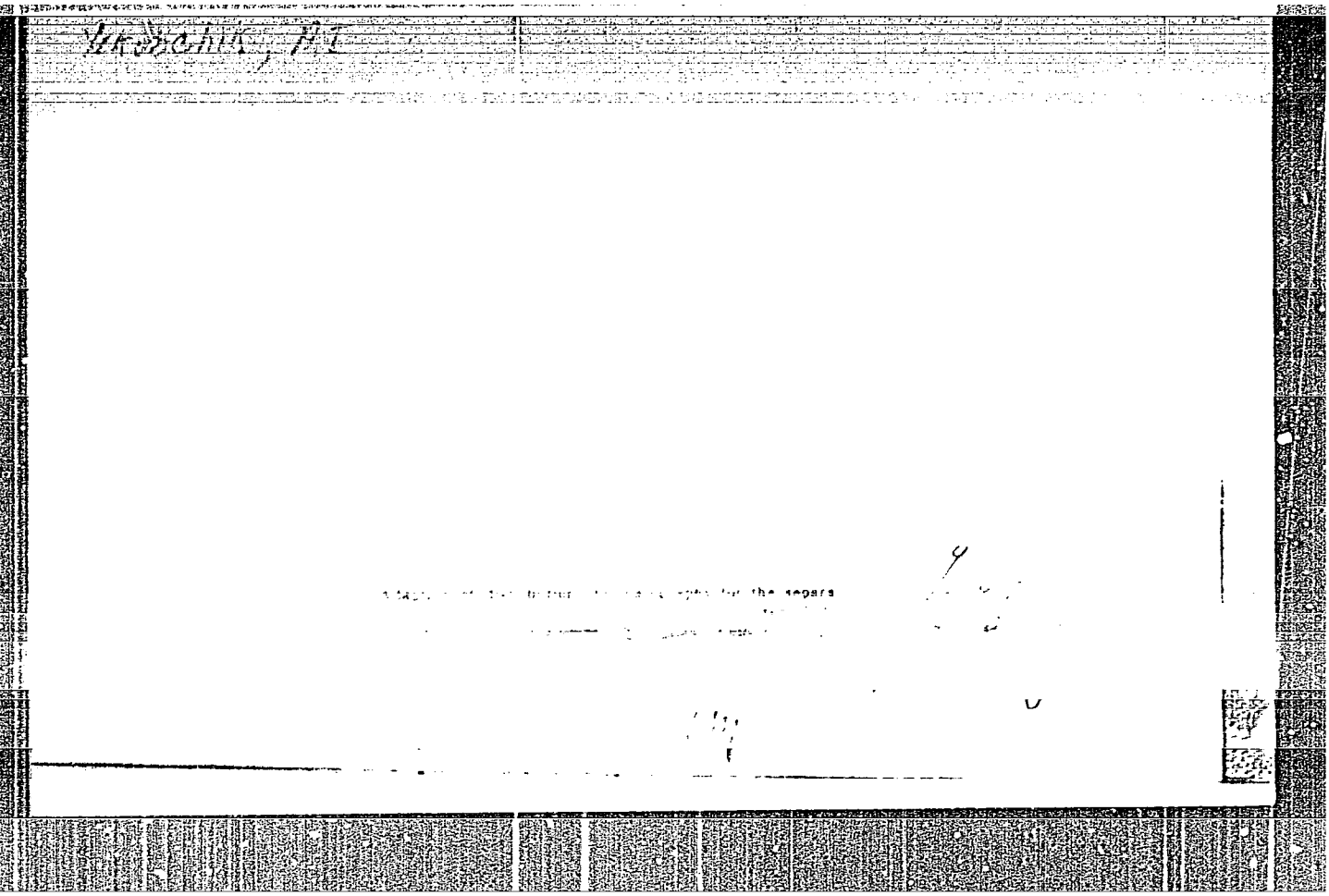
Card 1/2

USSR/ Analytical Chemistry. Analysis of Organic Substances. G-3

Abs Jour: Referat. Zhur.-Khimiya, No. 8, 1957, 27260.

170) was introduced into columns (7 g into a small column, 25 g into a middle sized one) as suspension in 6 to 7 or 23 to 25 ml of water. The mixture of acids was dissolved in a 50%-ual mixture of tert-$C_5H_{11}OH$ with $CHCl_3$, and this solution (0.3 or 1.2 to 1.3 ml) was introduced into the columns. The method of gradient elution was applied, in which mixtures of n-C_4H_7OH-$CHCl_3$ (saturated with H_2O) with increasing polarity (at the expense of the rise of n-C_4H_7OH content) were used as eluants. The eluate was collected in fractions of 3 to 4 ml each, and these fractions were titrated with 0.017 and 0.029 n. NaOH solutions. In order to identify the separated acids, experiments with standard mixtures were carried out, and the volume peaks and elution limits were compared.

Card 2/2



YAKUBCHIK, A.I.; SUBBOTIN, S.A.; GROMOVA, G.N.

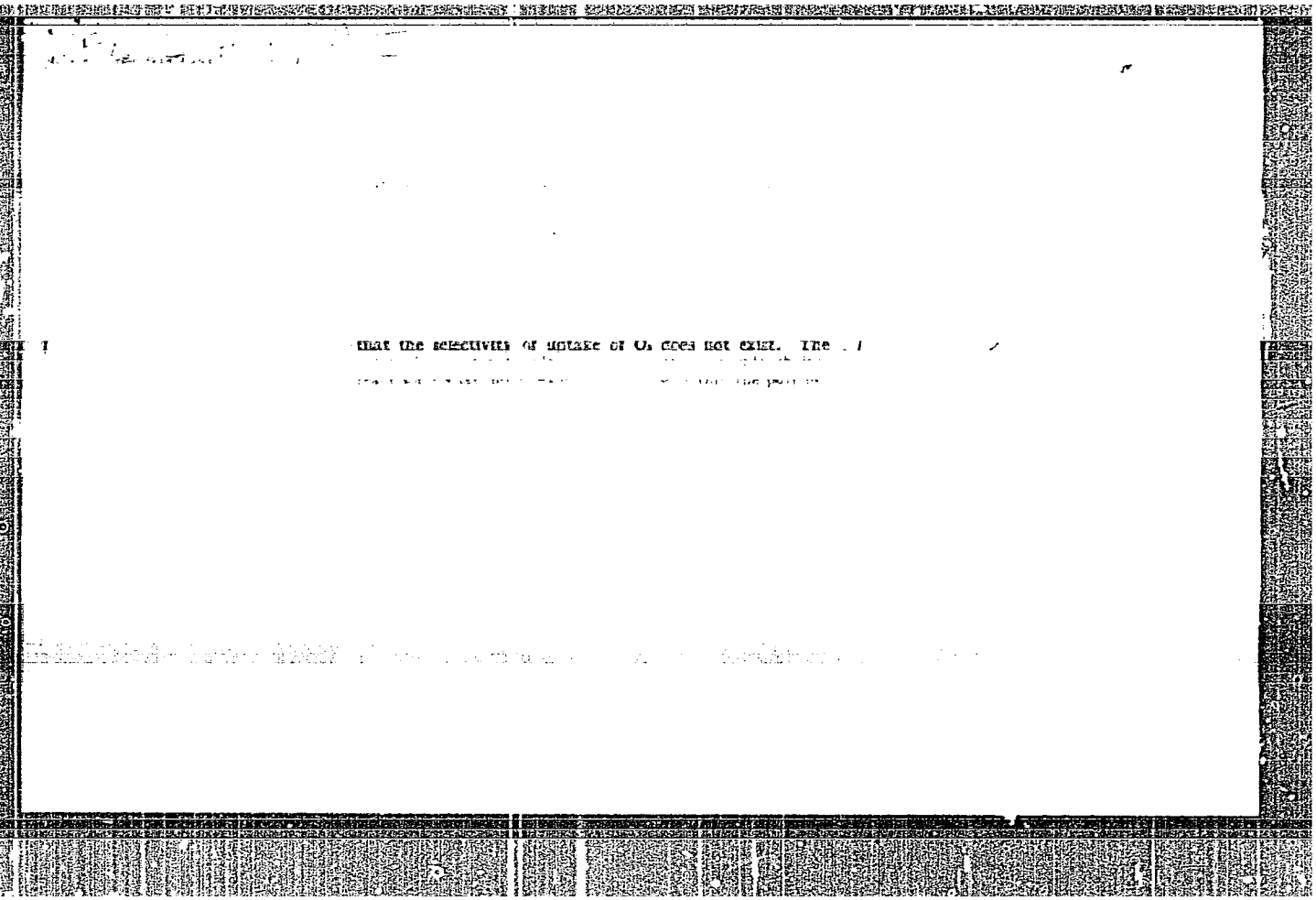
Effect of hydrogenation on the characteristics of rubbers.
Kauch. i rez. 16 no.7:12-16 Jl '57. (MIRA 10:10)

1.Vsesoyuznyy nauchno-issledovatel'skiy institut sinteticheskogo kauchuka im. S.V. Lebedeva.
(Rubber) (Hydrogenation)

VARUBKIK A. I.

7

H_2O_2 treatment of the above



that the selectivity of uptake of O_2 does not exist. The

YAKUBCHIK, A.I.

LEBEDEV, Sergey Vasil'yevich; YAKUBCHIK, A.I., red.; LISHANSKIY, I.S., red. izd-va; ARONS, R.A., tekhn.red.

[Selected works in organic chemistry] Izbrannye raboty po organicheskoi khimii. Red. A.I.Iakubchik. [Moskva] Izd-vo Akad. nauk SSSR, 1958. 660 p. (MIRA 11:6)
(Chemistry, Organic)

YAKUBCHIK, A. I.

AUTHORS: Yakubchik, A. I., Spasskova, A. I., Tsitokhtnev, V. A. 79-1-30/63

TITLE: Investigations of the Chemical Structure of Boletic Polymer Divinyl II (Izucheniye khimicheskogo stroyeniya gubchatogo polimera divinila. II)

PERIODICAL: Zhurnal Obshchey Khimii, 1958, Vol. 28, Nr 1, pp. 143-149 (USSR)

ABSTRACT: In the ozonolysis products of the boletic (spongy) polymer the authors earlier detected the presence of formic, succinic, butane-1,2,4-tricarboxylic and hexane-1,x,y,6-tetracarboxylic acid. Kahrach (reference 3) assumed that this polymer was a polymer structure. In the present paper the acids were separated according to the method of classifying chromatography, a method which permits an exact separation also of those acids which little differ in their structure and molecular weight and which occur in small quantities. Beside the above-mentioned acids propane-1,2,3-tricarboxylic and levulinic acid were found. Moreover peak II on chromatogram 1 corresponds to propionic acid. Its development

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is to be understood on the basis of an abnormal ozonolysis of the part -1,4,-1,4. Propane-1,2,3-tricarboxylic acid formed in the ozonolysis of the ramified part developed on the transfer of the chain after the α-methyl group in the domain -1,4 - 1,4. Marvel (reference 5) considered it an abnormal ozonolysis product. Levulinic acid might have developed according to the given scheme. Figures 1 and 2 show chromatograms which were taken in the separation of the acids obtained from the ozonolysis products of the divinyl boletic polymer. The percentages of the carbon skeleton of the polymer in the acids and of its carbon skeleton in the parts of the chromatogram were chromatographically calculated. The results are represented in tables 1 and 2. In the divinyl spongy polymer which does not possess any properties of rubber, the authors determined chromatogram domains of a structure which divinyl caoutchoucs also have. As the properties of the high-molecular compounds are not only determined by the chemical structure, but also by shape, size, mutual position and interaction of the molecules, it is

Investigations of the Chemical Structure of Boletic Polymer Divinyl II 79-1-30/63

possible that the divinyl polymer consists of a chain of macromolecules which are tied together to a small bundle by an insoluble nucleus. Thus it seems that the formation mechanism of the divinyl boletic polymer suggested by Kahrach is the correct one.
There are 2 figures, 5 tables, and 11 references, 5 of which are Slavic.

ASSOCIATION: Leningrad State University (Leningradskiy gosudarstvennyy universitet)

SUBMITTED: December 21, 1956

AVAILABLE: Library of Congress

Card 3/3 1. Chemistry 2. Polymers-Chemical analysis 3. Chromatograms

Yakubchik A I

79-2-31/64

AUTHORS: Yakubchik, A. I., Motovilova, N. N.

TITLE: On the Structure of the Potassium Divinyl Polymer (O strukture kaliy- divinilovogo polimera).

PERIODICAL: Zhurnal Obshchey Khimii, 1958, Vol. 28, Nr 2, pp. 421-424 (USSR)

ABSTRACT: The percental content of groups with external 1,2- (-CH-CH_2-) and internal 1,4-(-CH_2-CH=CH-CH_2-) double bindings as well as their influence on the polymerization depth and the properties of the polymer, the nature of the alkaline metal as polymerization stimulans, and the reaction temperature were investigated. The product of the polymerization of divinyl in the gas phase, under the influence of potassium, was used as polymer. Compared with SKB-Caoutchouc it showed favorable differences in the properties which is obtained by polymerization of divinyl in the presence of sodium. The method of ozonolysis according to Harries was used in the investigations. The method according to Finke was used for the determination of the formic acid produced on this occasion, whereas formaldehyde was determined according to Foss. The determination of the quantities of the 1,2- and 1,4- groups in the polymers was carried out according to A. A. Vasil'yev with iodine bromide (which yields more reliable results than iodine

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On the Structure of the Potassium Divinyl Polymer. 79-2-31/64

chloride). The elementary analysis served for the determination of the oxidation stages of the purified 1,2-polymer, whereas the polymerization depth was expressed by the "increase" of the polymer g/1 g metal. The results obtained are given in the tables. The carrying out of the experiments is discussed. The results are the following: with the increase of the polymerization depth decreases a little the content of groups with external double binding (1,2-) which is confirmed by the parallel decrease of the vitrification temperature of the polymer as well as by the increase of the freezeproofness coefficient of the vulcanisate. Among other this phenomenon is explained by the increase of the actual polymerization temperature. The number of groups with internal double binding (1,4-) does practically not change, the results obtained are, however, insufficient for quantitative conclusions. There are 3 tables, 13 references, 5 of which are Slavic.

ASSOCIATION: All-Union Scientific Research Institute for Synthetic Rubber (Vsesoyuznyy nauchno-issledovatel'skiy institut sinteticheskogo kauchuka).

SUBMITTED: January 14, 1957.
AVAILABLE: Library of Congress
Card 2/2

AUTHORS: Yakubchik, A. I., Spasskova, A. I., Tikhomirov, B. I. 79-28-4-15/60

TITLE: On the Abnormal Products of the Ozonolysis of the Vinyl-1-Cyclohexene-3 (Ob anormal'nykh produktakh ozonoliza vinil-1-tsiklogeksena-3)

PERIODICAL: Zhurnal Obshchey Khimii, 1958, Vol. 28, Nr 4, pp. 916-920 (USSR)

ABSTRACT: Long ago it was already observed, that in products of ozonolysis such substances may be present, the production of which can not be explained by the traditional schemes of the formation and decomposition of ozonides. These substances were later on designated as abnormal products of ozonolysis. Further investigations and an improvement of the analytical methods showed that the formation of abnormal products during ozonolysis is a quite common phenomenon (References 1,2). Even in the case of substances with a well known structure the problem of the degree of abnormal reaction courses is not

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On the Abnormal Products of the Ozonolysis of the Vinyl-1-Cyclohexene-3

easily solved. In high polymers and in rubber it is even more complicated. Some knowledge on the course of the reaction may be gained from the investigation of the behaviour of a model substance with a known structure showing the structural properties of rubber. Vinyl-1-cyclohexene-3 may serve as a model for divinyl rubber. In the present paper the products of the oxidation decomposition of vinyl-1-cyclohexene-3-ozonide by means of acetylhydrogen peroxide were investigated. The same conditions were applied in this process as are used in the ozonolysis of divinyl rubbers in the laboratory. The influence of the α-methylene group and of the tertiary carbon atom bound to the vinyl group on the formation of abnormal ozonolysis products was also examined. The separation of the acids forming in the decomposition of the ozonide was performed with the help of distributive chromatography. Summary: 1) Apart from normal products -1,2,4-butanetricarbonic - and formic acids - also abnormal products - succinic acid, 1,2,3-propanetricarbonic-

and propionic acids were found in the ozonolysis products of vinyl-1-cyclohexene-3. 2) β-ethylglutaric acid , an abnormal product, was discovered in the ozonolysis products of ethyl-1-cyclohexene-3. 3) The abnormal reactions are caused as well by the presence of the α-methyl group as by the labile bond between the tertiary carbon atom and the carbon atom in the double binding. 4) A somewhat lower yield of 1,2,4 butanetricarbonic acid and a somewhat higher yield of succinic acid as well as of 1,2,3 propanetricarbonic acids may be expected in the products of ozonolysis of divinyl rubbers, the macromolecules of which have a structure range of -1,4 -1,2 -1,4 - . There are 2 figures, 1 table and 21 references, 6 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: April 12, 1957

SOV/79-28-8-12/66

AUTHORS: Yakubchik, A. I. Spasskova, A. I., Shibayev, L. A.

TITLE: Investigation of the Chemical Structure of Sodium Carbonate Divinyl Polymers (Izucheniye khimicheskogo stroyeniya natriy-uglekislotnogo polimera divinila)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol. 28, Nr 8, pp.2056-2061 (USSR)

ABSTRACT: The sodium carbonate divinyl polymer forms by polymerizing divinyl in the presence of metallic sodium in an envelope of dry carbon dioxide. (Refs 1, 2). Steinig (Shtemmig) used the isoprene polymers levulin aldehyde and levulinic acid, the decomposition products of the ozonides of sodium carbonate, to show that the isoprene is bonded to the sodium carbonate polymer in the 1 and 4 positions. In investigating the chemical structure of the sodium carbonate divinyl polymer, which was maintained at temperatures of 20° and 50°, the authors found that in this polymer a greater per cent composition of the divinyl molecules was bonded in the 1 and 4 positions and that its structure resembles that of the spongy divinyl polymer (Ref 3). Table 1 shows the chemical structures of the sodium carbonate and the spongy polymers.

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Investigation of the Chemical Structure of Sodium Carbonate Divinyl Polymers

Although their structures are similar to those of the rubbery polymers, their properties differ greatly from those of the sodium divinyl rubbers. These latter are inelastic and relatively insoluble as a result of their chemical structures and other factors characteristic of compounds of high molecular weight. The structure of the sodium carbonate divinyl polymer was investigated by ozonolysis. The products of this ozonolysis were found to be levulinic acid, formic acid, and succinic acid, as was also the case in the ozonolysis of the rubbery divinyl polymer and the divinyl rubber (Refs 3, 4). In figures 1, 2 and 3 the chromatograms of the acids are given, showing how the polymers in question separated from the other products of the ozonolysis. According to these chromatograms the per cent of carbonic acid skeleton of the polymer in the acid and in the ozonolysis sections was calculated. The results are given in tables 2 and 3. There are 3 figures, 5 tables, and 10 references, 7 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet
(Leningrad State University)

SOV/79-28-8-12/66

Investigation of the Chemical Structure of Sodium Carbonate Divinyl Polymers

SUBMITTED: June 28, 1957

Card 3/3

SOV/79-28-11-42/55

AUTHORS: Yakubchik, A.I., Spasskova, A.I., Zak, A.C., Shostatskaya, I.D.

TITLE: Comparative Investigation of the Chemical Structure of the Rubbers SKB and SKBM by Ozonolysis (Sravnitel'noye izucheniye khimicheskogo stroyeniya kauchukov SKB i SKBM metodom ozonoliza)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol 28, Nr 11, pp 3090-3096 (USSR)

ABSTRACT: In the USSR three types are manufactured: the sodium divinyl rubber (SKB), the potassium divinyl rubber (SKV), and the lithium divinyl rubber (SKBM) which differ with respect to their vitrification temperature and elasticity. A comparison is made between the chemical structure of SKB and that of SKBM rubbers. These two rubbers differ in their behaviour to frost. The chemical structure was investigated by ozonolysis. In the separation of the acids obtained in the oxidizing cleavage of the ozonides the distribution chromatography was used. The chromatograms of the acid ozonolysis products of the rubbers to be investigated were plotted. Basing on the chromatograms and the chemical characterization of some acids in the ozonolysis the following acids were found: succinic, butane-1,2,4-tricarboxylic, propane-1,2,3-tricarboxylic, hexane-1,x,y,6-tetracarboxylic, formic, and levulinic

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Comparative Investigation of the Chemical Structure of the Rubbers SKB and SKBM by Ozonolysis

acid, which were also found in the ozonolysis products of the other divinyl rubbers (Refs 3-5). In the figures 1-4 the acid chromatograms are given. According to these chromatograms the percentage of the carbon skeleton in the parts of diverse structure is calculated (Table 1). The ozonolysis products of the SKB rubber contain 77 % carbon skeleton, and those of the SKBM rubber 82.6 %. In the rubber SKBM parts of the same structure as in rubber SKB were found, however, the percentage of the carbon skeleton in the parts-1,4-1,4- and-1,4-1,2-1,4- of rubber SKBM is higher than of rubber SKB. The structure of SKBM is more regular. This property is one of the factors that determine its stability to frost.- There are 4 figures, 4 tables, and 15 references, 10 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

YAKUBCHIK, A.I.; ZYKOVA, S.K.; GONCHARUK, S.P.

Investigation of the chemical structure of sodium-divinyl SKB (rod process) rubber. Zhur.prikl.khim. 31 no.11:1697-1704 N '58.
(MIRA 12:2)

1. Kafedra vysokomolekulyarnykh soyedineniy Leningradskogo gosudarstvennogo ordena Lenina universiteta im. A.A. Zhdanova.
(Rubber, Synthetic)

5(3) SOV/79-29-8-45/81

AUTHORS: Yakubchik, A. I., Pilatova, V. A.

TITLE: Investigation of the Chemical Structure of Different Fractions of Sodium-divinyl Rubber

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 8, pp 2658-2663 (USSR)

ABSTRACT: A comparative investigation of the degree of branching of the macromolecules of divinyl rubber is of considerable scientific and practical interest, since this problem is related to the interpretation of the polymerization mechanism and with the dependence of the structure of the highly molecular compounds on their properties (Ref 1, and I. Ya. Poddubnyy, Ref 2). In the present paper, the comparative investigation of the chemical structure of eight fractions of sodium divinyl rubber was carried out in order to determine their degree of branching. The separation of the fractions of this rubber was performed by means of fractional precipitation (Ref 3) (Table 1). The chemical structure of the fractions separated was determined by means of oxidizing decomposition of the ozonides (Refs 4,5). The resultant acids (levulinic, acetic, formic, succinic, 1,2,4-butane-tricarboxylic, 1,2,3-propane-tricarboxylic, 1,2,4,6-hexane-tetracarboxylic acid) were separated by means of selective chromatography; according to the chromatograms, the

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percentage content of the carbon skeleton of the polymer in them was also calculated (Table 2 and figure of the chromatogram). The sodium divinyl rubber obtained at 40° was divided into 8 fractions according to the fractional precipitation method, with molecular weights of 835000 up to 20000. According to the methods of infrared spectroscopy, and of ozonolysis, the percentage content of the links (1,2) was determined which is practically the same in all fractions. It was found by means of the ozonolysis that all fractions contain parts with macromolecules of the same structure and comparatively same size. In all fractions macromolecules were found which were branched at the α-methylene groups, and had the same size. This indicates that the branching of the fractions investigated is the same. In the experimental part, the determination of molecular weights, elementary composition, degree of unsaturation (according to the method of Kemp-Vasil'yev, Ref 11), percentage content of double bonds, and the ozonolysis are described in detail. There are 1 figure, 3 tables, and 18 references, 12 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University).

SOV/80-32-5-29/52

5(3)

AUTHORS: Yakubchik, A.I., [illegible]va, S.K., Vlasova, V.M.

TITLE: The Study of the Chemical Structure of Divinyl Emulsion Rubbers Obtained at the Temperatures +50 and - 35°C

PERIODICAL: Zhurnal prikladnoy khimii, 1959, Vol 32, Nr 5, pp 1092-1100 (USSR)

ABSTRACT: It is known [Refs 1-3] that the temperature has little effect on the content of 1,2 links in the mentioned rubber types, but considerable effect on the content of cis- and trans-links of the 1,4 type. Ozonolysis was used here to determine the relative quantity of these links and their position. The ozonides of the emulsion rubbers were decomposed by acetyl peroxide and the obtained acid mixtures were separated by distribution chromatography. Besides the acids which had already been found in the products of ozonolysis [Refs 4, 10-12], the following acids were detected: 1,2,3-propanetricarboxylic and levulic acid. The origin of the first acid can be explained by formation from the 1,4-1,4 part by transfer of the chain to the α -methylene-group, or by the addition of the monomer molecules to the new radical. The same acid is found in the ozonolysis of vinylcyclohexene [Refs 8, 9, 14, 15] which is a model of the 1,4-1,2-1,4 part. The levulic acid

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The Study of the Chemical Structure of Divinyl Emulsion Rubbers Obtained at the Temperatures +50 and -35°C

can be formed from the isomerized 1,4-1,2-1,4 part [Ref 9]. It was also found in the oxidation decomposition of the ozonide of vinylcyclohexene [Refs 14-16]. There were three non-identified acids designated in Figures 1 and 2 by I^1, I, IV^1 and V. The investigated rubbers are very similar in their chemical structure.
There are: 6 graphs, 2 tables and 17 references, 7 of which are Soviet, 5 English, 3 American and 2 German.

SUBMITTED: December 30, 1957

Card 2/2

YAKUBCHIK, A.I., TIKHOMIROV, B.I.

Investigation of the products of the ozonolysis of 1-vinyl-3-cyclohexene and 1-ethyl-3-cyclohexene. Trudy LTI no.58:45-50 '59. (MIRA 13:7)

1. Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova.
(Cyclohexene) (Ozone)

5.3830

77365
SOV/79-30-1-26/78

AUTHORS: Yakubchik, A. I., Tikhomirov, B. I.

TITLE: Concerning the Conditions of 1,4-Polybutadiene Hydrogenation at Atmospheric Pressure

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol 30, Nr 1, pp 128-132 (USSR)

ABSTRACT: Hydrogenation of 1,4-polybutadiene was carried out in decalin at 140° over the following catalysts: palladium black, palladium on calcium carbonate, skeletal nickel, and platinum black. Table A shows the conditions of 1,4-polybutadiene hydrogenation.

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Concerning the Conditions of 1,4-Polybutadiene Hydrogenation at Atmospheric Pressure

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Table A. Effect of conditions on degree of 1,4-polybutadiene hydrogenation.

Nr OF EXPERIMENT	CATALYST	CONCENTRATION OF SOLUTION (%)	RATIO OF RUBBER:CATALYST	TEMPERATURE	% OF CONSUMED HYDROGEN	UNSATURATION (%)
1	PALLADIUM BLACK	0.1	1 : 1	100°	12.5	85.7
2		0.1	1 : 1	120	19.8	78.6
3		0.1	1 : 1	140	43.8	54.8
4		0.1	1 : 1	160	38.2	59.1
5		0.3	3 : 1	140	34.5	65.0
6		0.3	1 : 1	140	68.9	29.4
7		0.5	1 : 1	140	68.6	30.4
8		0.7	1 : 1	140	69.9	29.1
9		1.0	1 : 1	140	67.3	28.4
10		1.5	1 : 1	140	61.5	35.2
11		0.3	1 : 1	180	33.6	56.8
12	PALLADIUM ON $CaCO_3$	0.5	1 : 2	140	75.4	22.5
13		0.5	1 : 10	140	76.7	22.8
14	SKELETAL NICKEL	0.5	1 : 2	140	42.0	56.3

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Concerning the Conditions of 1,4-Polybutadiene Hydrogenation at Atmospheric Pressure

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SOV/79-30-1-26/78

It is necessary to remove alcohol from the skeletal nickel and to wash it with pentane before it can be used in the reaction. The unsaturation of the obtained products was determined with iodine bromide for reaction products soluble at room temperature (experiments 1 and 2), and with bromine (by bromination) for reaction products insoluble at room temperature. It is important to carry out the bromination without light to avoid substitution. The authors thank V. A. Krol' for supplying 1,4-polybutadiene samples. There are 2 figures; 1 table; and 23 references, 7 Soviet, 9 U.S., 1 U.K., 6 German. The 5 most recent U.S. references are: Blanchett, J. H., Cotman, J. D., J. Org. Ch., 23, 1117 (1958); Peters, H., Lockwood, W., Rubber World, 138, Nr 3, 418 (1958); Chem. Eng. News, 36, Nr 29, 56 (1958); Amer. Patent 2813809 (1957); Amer. Patent 2731439 (1956).

ASSOCIATION: Leningrad State University (Leningradskiy gosudarstvennyy universitet)

SUBMITTED: January 19, 1959

Card 3/3

S/079/60/030/007/007/020
B001/B063

AUTHORS: Yakubchik, A. I., Spasskova, A. I.

TITLE: Investigation of the Chemical Structure of the Rubbers SKN-26 and SKN-40 by the Method of Ozonolysis

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 7, pp. 2172-2176

TEXT: Divinyl nitrile rubbers were produced by the simultaneous polymerization of divinyl and nitrile of acrylic acid. The Soviet industry produces three types of these rubbers, СКН-18 (SKN-18), СКН-26 (SKN-26), and СКН-40 (SKN-40), which are highly resistant to benzene and oils. The structure of the commercial types SKN-26 and SKN-40 were studied by the authors in ethyl acetate by means of ozonolysis. The final products were separated by chromatographic adsorption analysis which showed the following acids: formic, propionic, succinic, butane-1,2,4-tricarboxylic, propane-1,2,3-tricarboxylic, and hexane-1,2,4,6-tetracarboxylic acids. These acids may have formed by ozonolysis in the following way: succinic acid from the groups 1,4-1,4, formic acid from the groups 1,4-1,2-1,4- and 1,4-$(1,2)_2$-1,4, butane-1,2,4-tricarboxylic acid from the groups

Card 1/3

1,4-1,2-1,4 or from group (I) (Refs. 1,2): $-CH_2-CH=CH-CH_2-CH_2-\underset{\underset{C\equiv N}{|}}{CH}-CH_2-CH=CH-CH_2-$, hexane-1,2,4,6-tetracarboxylic acid from the groups 1,4-$(1,2)_2$-1,4 or from the groups (II) and (III); propane-1,2,3-tricarboxylic acid may have formed from the groups 1,4-1,4, which are branched at the α-methylene group, or as an anomalous ozonolysis product of the groups 1,4-1,2-1,4 (Refs. 3,4). The presence of propionic acid is indicative of a radical decomposition of the carbon chain of rubber during ozonolysis and of a decomposition of the ozonide by way of oxidation. The unexpectedly high yield of butane-1,2,4-tricarboxylic and hexane-1,2,4,6-tetracarboxylic acids indicates that these acids were formed in the ozonolysis from the groups (I), (II), and (III). On the basis of the acid quantities found in the products of ozonolysis, the authors determined their percentual content of the carbon skeleton (Table 1). The acids identified in SKN-26 and SKN-40 contain 75 and/or 77.6% of the carbon skeleton of these rubbers. The residual part of the carbon skeleton comprises the unidentified acids (Figs. 2 and 3)

(Chromatogram 1), which fact is due to the inevitable losses occurring in ozonolysis. There are 3 figures, 2 tables, and 7 references: 6 Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: July 1, 1959

S/080/60/033/005/007/008

AUTHORS: Yakubchik, A.I., Filatova, V.A.

TITLE: The Investigation of the Chemical Structure of Divinyl Rubbers Subjected to the Action of γ-Radiation

PERIODICAL: Zhurnal prikladnoy khimii, 1960, Vol 33, No 5, pp 1177 - 1182

TEXT: The effect of γ-radiation on the chemical structure of divinyl rubbers with a low (14%) and a high (70%) content of 1,2 links was studied. The chemical structure of the rubbers which were subjected to various doses of γ-irradiation was determined by the method of ozonolysis. The mixture of acids obtained in the oxidation decomposition of ozonides was separated by the method of distribution chromatography. The percentage of the carbon skeleton of the polymer was calculated from the chromatograms obtained in the acids. The chromatograms obtained do not differ qualitatively from the chromatograms of the initial rubbers irradiated, but the height of the peaks on them decreases when the irradiation dose increases. Based on the decrease of the peak height a conclusion can be drawn on the decreasing number of double bonds in 1,2 and 1,4 links, from which the following sections are built

S/080/60/033/005/007/008

The Investigation of the Chemical Structure of Divinyl Rubbers Subjected to the Action of γ -Radiation

up: 1,4 - 1,4; 1,4 - 1,2 - 1,4; 1,4 - $(1,2)_2$ - 1,4. In the products of ozonolysis of divinyl rubbers containing 70% 1,2-links and 14% 1,2-links, formic acid and formic aldehyde were determined. In the case of 70% 1,2 links, the content of formic acid and aldehyde decreased, in the second case they increased. It is evident that in the macromolecules with a low content of 1,2 links new sections appear which can form formic acid and aldehyde during ozonolysis.

There are 4 tables, 3 graphs, and 19 references: 12 Soviet, 5 English, 1 German and 1 American

SUBMITTED: November 25, 1959

Card 2/2

30867
S/054/61/000/004/008/009
B102/B138

11,2211

AUTHORS: Yakubchik, A. I., Tikhomirov, B. I., and Sulimov, V. S.

TITLE: Hydrogenation of natural and synthetic cis-1,4-polyisoprene

PERIODICAL: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 4, 1961, 135 - 138

TEXT: The authors studied the influence of experimental conditions on the hydrogenation depth of natural cis-1,4-polyisoprene separated from latex, and synthetic non-branched cis-1,4-polyisoprene. Their molecular weight was 900,000 and 230,000, respectively. The polyisoprenes were both purified by precipitation from a benzene solution. Then they were dissolved in decaline and hydrogenated by electrolytic hydrogen (80 - 100 atm) with nickel-nickelguhr catalyst. For natural rubber (98% cis-1,4-isoprene) temperature, duration of hydrogenation, and rubber-to-catalyst ratio (C) were varied, for synthetic cis-1,4-isoprene, temperature, C, and concentration of solution were varied and the depth of hydrogenation was determined in each case. It was dependent on the viscosity of the solution, i. e., on the molecular weight of the polyisoprene. Hydrogenation

Card 1/2

Hydrogenation of natural and synthetic...

was easier with a rubber of low molecular weight. Depth was increased by raising temperature, or increasing the amount of catalyst or length of reaction period. No trans-1,4-polyisoprene could be detected by infrared absorption tests. This means no cis-trans isomerization took place. An ИРФ-22 (IRF-22) refractometer was used to determine the refractive indices. The refractive index of the polymer was found to decrease with depth of hydrogenation. This means that cyclization does not occur. The refractive index of the hydrogenated rubbers depends linearly on the degree of non-saturation. The vitrification temperature rises with increasing depth of hydrogenation. The authors thank V. N. Reykh for the synthetic cis-1,4-polyisoprene. There are 4 tables and 7 references: 5 Soviet and 2 non-Soviet. The reference to the English-language publication reads as follows: G. Verghese. Rubb. Chem. and Technol. 22, 731, 1949.

89995

S/190/61/003/003/012/014
B101/B204

15.9201

AUTHORS: Tikhomirov, B. I., Yakubchik, A. I., Klopotova, I. A.

TITLE: The crystallinity of the hydrogenation products of cis-1,4-polybutadiene

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 3, 1961, 486

TEXT: In the present "Letter to the Editor" it is said that cis-1,4-polybutadiene, which contained 6% 1,2 links, 1, 2 or 5% trans-1,4 links, was hydrogenated at different intensities. The X-ray structural analysis of the hydrogenation products showed that they are of crystalline structure with a degree of non-saturation of 70% and less, i.e., with commensurable quantities of disordered hydrogenated and non-hydrogenated links. It is assumed that also polymers with a lower number of hydrogenated links are capable of being crystallized, but their melting point is probably below 0°C. It was further observed that the hydrogenation products yielded spherolites. With a growing degree of hydrogenation, the spherolites became visible with increasing distinctness. The following explanation is given: By hydrogenation, the chains become less flexible.

Card 1/2

The crystallinity of the ....

The interaction between the chains becomes more intensive, and an ordering of the macromolecules in the threedimensional lattice occurs. The conclusion is drawn that linear ethylene and butadiene copolymers, should it be possible to synthetize them by polymerization, will exhibit rubber properties only if they contain a sufficient number of cis-1,4-butadiene links. There are 2 references: 1 Soviet-bloc and 1 non-Soviet-bloc.

SUBMITTED: November 17, 1960

Card 2/2

YAKUBCHIK, A.I.; TIKHOMIROV, B.I.; SULIMOV, V.S.

Hydrogenation of natural and synthetic cis-1,4-polyisoprene. Vest LGU 16 no.22:135-138 '61. (MIRA 14:11)
(Isoprene) (Hydrogenation)

27072
S/080/61/034/003/014/017
A057/A129

15.9201
11.2211

AUTHORS: Yakubchik, A. I., Tikhomirov, B. I., Mikhaylova, L. N.

TITLE: Hydrogenation of sodium-polybutadiene

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 3, 1961, 652 - 655

TEXT: The effect of varying conditions on the degree of hydrogenation of sodium-polybutadiene was investigated. Also some properties of hydrogenated products with a different degree of saturation were determined. The greatest influence on the degree of hydrogenation was shown by the ratio polybutadiene/catalyst in hydrogenation of sodium-polybutadiene in solution with a Nikel-kieselguhr catalyst. In the temperature range of 60 - 140°C no cyclization occurs. The ethylene bonds in sodium-polybutadiene are hydrogenated in preference to the [illegible] bonds. The present work was carried out in continuation of former investigations on hydrogenation of cis-1,4-polybutadiene [Ref. 1: ZhOKh, 30, 129 (1960)]. Comparing the structure of cis-1,4-polybutadiene to the structure of sodium-butadiene the present authors expected that hydrogenation of the latter will proceed more easily and an amorphous product will be obtained. Both assumptions were proved by the present experiments. Industrial-grade sodium-polybutadiene (SKB (SKB)

Card 1/6

Hydrogenation of sodium-polybutadiene

type] with a mean molecular weight of 230,000 was used and prepared in a manner previously described (Ref. 1). The saturation degree of 87.7% was determined from an iodine-bromide solution according to A. A. Vasil'yev [Ref. 2: Zh.OKh, 17, 993 (1947)]. Isooctane was used as solvent and hydrogenation was carried out with a nickel-kieselguhr catalyst and electrolytic hydrogen (70 - 100 atm) in an autoclave (2 l) agitated electromagnetically (2,700 rpm) with an agitator designed by N. Ye. Vishnevskiy. The catalyst was prepared by reducing nickel oxide on kieselguhr in an electrolytic hydrogen stream at 300°C for 3 hrs. Before preparing, the catalyst was stored in the used solvent (isooctane). The hydrogenated polymer was precipitated by acetone and then centrifuged at 2,500 - 2,700 rpm, washed, dried, and the saturation degree was determined with iodine bromide. The effect of various conditions on the saturation degree was determined and results are presented in Table 1. Differently from emulsified polybutadiene, which was investigated by F. F. Jones et al. [Ref. 3: Ind. Eng. Chem., 45, 1117 (1953)], no considerable effect of temperature could be observed, but an effect of the ratio butadiene:solvent. The preference in hydrogenation of external double-bonds observed already in hydrogenated polybutadiene in a prior work [Ref. 4: ZhOKh, 26, 1381 (1956)] and also in emulsified polybutadiene (Ref. 3) is according to infrared-spectroscopic data (Table 2)

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Hydrogenation of sodium-polybutadiene

much greater in hydrogenation of sodium-polybutadiene. Vitrification temperature measured according to A. I. Marey [Ref. 5: Tr. VNIISK (Proceedings of the All-Union Scientific Research Institute of Synthetic Rubber imeni Academician S. V. Lebedev), 3, 173 (1951)] decreases with increasing hydrogenation degree (Table 3). This is apparently due to the fact that first vinyl groups are hydrated resulting in a weakening of molecular interaction and increasing elasticity of the molecules. The amorphous state of sodium-polybutadiene is stable due to the irregular structure and branched macromolecule. Thus hydropolybutadiene is a valuable frostproof polymer. Determinations of the change in refractive index (Table 4) with saturation degree indicate that no cyclization occurs during hydrogenation, since an increasing saturation degree effects a decrease in refraction index, i. e., an opposite effect than observed in cyclization by J. R. Shelton and L. H. Lee [Ref. 6: Rubber Chem. and Technol., 31, 2, 415 (1958)]. There are 4 tables and 6 references: 4 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: R. V. Jones et al. Ind. Eng. Chem., 45, 1117 (1953); J. R. Shelton, L. H. Lee, Rubber Chem. and Technol., 31, 2, 415 (1958).

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: September 13, 1960

Card 3/6

S/080/61/034/007/013/016
D223/D305

AUTHORS: Yakubchik, A.I., Zykova, S.K., Vlasova, V.M., and Shostatskaya, I.D.

TITLE: Determining regularity of the structures of isoprene rubbers by the nature of joins of 1,4 bonds

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 7, 1961, 1608 - 1611

TEXT: The study of the effect of the microstructure of isoprene rubbers on their properties has determined that high strength of unadultered blends was possessed by the polymers having the most regular structure and containing minimum number of 1,2 and 3,4 bonds produced by the catalytic polymerization. However emulsified isoprene polymers, containing a small percentage of 1,2 and 3,4 bonds ($\simeq$ 7 %) and the main part trans-form of 1,4 bonds had a low strength characteristic (Ref. 2: A.A. Korotkov, K.B. Piotrovskiy, D.P. Feringer, DAN SSSR, 110, 1, 89, 1956). The small strength of

Determining regularity of the ...

emulsified polymers indicate their non-regular structure - non-uniformity in bonding of 1,4-1,4 and 1,4-4,1 bonds, whose nature was investigated by infrared spectroscopy of the microstructures of isoprenes polymers. The present work deals with use of ozonalysis to establish the nature of 1,4-4,1 bonds in macromolecular samples of SKI obtained at 60, 50 and 0°C and of the emulsified rubber (SKIE) obtained at 5°C. The strength of investigated samples of unadultered rubbers SKI was 228-235 kg/cm^2 and of emulsified 30 kg/cm^2. Since ozonization and decomposition of ozonides from pars 1,4-4,1 acetonylacetone is formed, then the principal task was in separating it from the ozonalysis products and its subsequent estimation. Below is given the scheme of ozonalysis of members 1,4-4,1 :1,4-1,4 and 4,1-1,4 of macromolecule of the isoprene polymer

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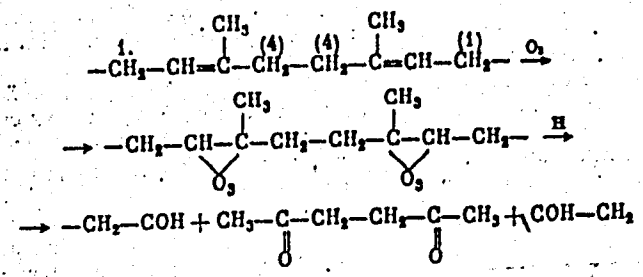
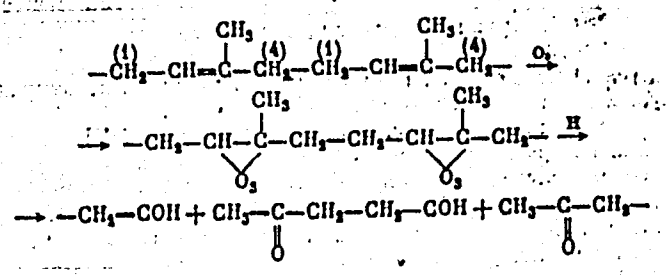
S/080/61/034/007/013/016
D223/D305

Determining regularity of the ...

Acetonylacetone



Levulinic aldehyde



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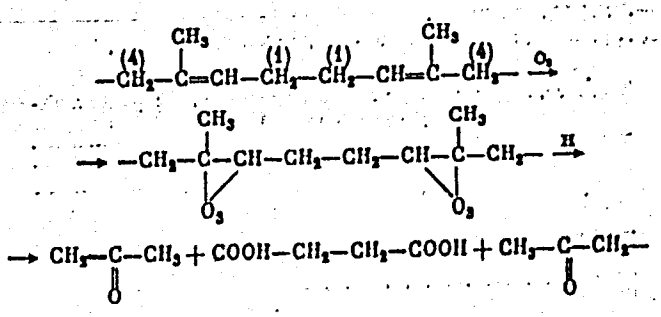
S/080/61/034/007/013/016
D223/D305

Determining regularity of the ...

Succinic acid



In determining the acetonylacetone in the product of ozonanalysis of rubber, the Steimmig method was used. The four inyestigated polymers were ozonized in methylacetate or chloroform. The decomposition of ozonides was done with hydrogen using a palladium catalyst, suspended on $BaSO_4$, at $0^{\circ}C$ in methylacetate. Under these

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Determining regularity of the ...

conditions the decomposition of ozonides consumes 98 % of calculated quantities of H_2 which indicated the complete reduction of decomposed ozonides. The calculation of acetonylacetone was done on the quantity of 1 phenylamino-2,5-dimethylpyrole obtained. The quantity found in the product of ozonalysis of emulsified rubber corresponded to 5.2 % of the carbon skeleton of the polymer. The progress of ozonization was determined by estimating the ozone in incoming and outgoing gases by iodometric titration. On the basis of results obtained it could be concluded that from the four investigated rubbers only macromolecules of emulsified polyisoprene contains members 1,4-4,1. Ozonalysis reactions are given. There are 1 table and 7 references: 5 Soviet-bloc and 2 non-Soviet-bloc.

SUBMITTED: December 23, 1960

Card 5/5

30200
S/080/61/034/011/013/020
D228/D301

15.9300

AUTHORS: Yakubchik, A.I., Reykh, V.N., Tikhomirov, B.I., and Pavlikova, A.V.

TITLE: Influence of hydrogenation on the properties of polybutadienes

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 11, 1961, 2501 - 2507

TEXT: The authors studied the influence of hydrogenation on some physico-mechanical properties of sodium-polybutadiene (I) and cis-1,4-polybutadiene (II): modulus of stretching, tensile strength, specific elongation, hardness, recoil elasticity, grindability, temperature of brittleness, frost-resistance coefficient, and gas permeability. Previous work by A.I. Yakubchik et al. has shown that the hydrogenation of such compounds gives both products with commensurate amounts of hydrogenated and unhydrogenated rings and polymers with predominantly hydrogenated rings; the properties of the obtained hydropolybutadienes depend on the original polymer's

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Influence of hydrogenation on the ...

structure. A.I. Yakubchik's method (Ref. 4: Zh. prikl. khimii, 34, 652, 1961) was followed in the hydrogenation of I and in preparing vulcanized rubbers with different microstructures and degrees of unsaturation. The procedure developed by the same author (Ref. 5: Zh. prikl. khimii, 34, 942, 1961) was used to obtain similar specimens - which possessed marked crystallinity - from the hydrogenation products of II. It is concluded from the experimental data that the tensile strength and specific elongation of the vulcanized rubbers obtained from the hydrogenation of I are at a minimum when the degree of unsaturation is decreased by approximately two-fold. The decrease of this latter also results in their increased hardness and resistance to heat-ageing and in their diminished brittleness-temperature, gas-permeability, and elasticity; this reduction of the chain elasticity is believed to be caused by the lessened number of double bonds in the chains and by the conversion of side-chain vinyl groups into ethyl groups. The degree of regulation in the polymer chains appears to influence favorably the rubbers' specific-elongation and tensile-strength, even in those cases when it does not lead to crystallization. The increased

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Influence of hydrogenation on the ...

frost-resistance of the rubbers is considered to be due to the decrease of the inter-chain reaction in polymers with a small degree of unsaturation - and hence to be related to the "internal plastification" effect. For the hydrogenation products of II the elasticity of vulcanized rubbers likewise decreases as the degree of unsaturation diminishes, but their hardness becomes greater. The rise in the temperature of vitrification, which was determined by Mareyev's method [Abstractor's note: No reference given], is connected with the increased rigidity of the polymer chains. There are 3 figures, 4 tables and 10 references: 8 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: J.D. D'Ianni, Ind. Eng. Chem. 40, 253, 1948; L. Kraus, Rubb. and Plast. Age 38, 880, 1957.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet i Vsesoyuznyy nauchno-issledovatel'skiy institut sinteticheskogo kauchuka im. S.V. Lebedeva (Leningrad State University and the All-Union Synthetic Rubber Research Institute im. S.V. Lebedev)

SUBMITTED: June 22, 1961

Card 3/3

30204
S/080/61/034/011/019/020
D204/D301

15.1123

AUTHORS: Yakubchik, A.I., Grilikhes, S.Ya., Tikhomirov, B.I., and Purlova, V.S.

TITLE: The bonding of polyethylene to metals and to rubber

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 11, 1961, 2579 - 2581

TEXT: A series of adhesives has been developed which alloy good bonding to be achieved between polyethylene and brass of brass-plated metals and with rubber, without the need for pretreating the surfaces. A short review of the Western work in this field is given and it is considered that partially hydrogenated, linear 1,4 polybutadiene would form the basis of a satisfactory adhesive, owing to structural similarities with polyethylene. Adhesive compositions were as follows: Partially hydrogenated 1,4 polybutadiene 100, ZnO 40-50, petroleum ether 3-5, sulphur 2-5, trimethyl dihydroquinoline 1, stearic acid 0.5 and mercaptobenzazole 0.5 - 1 parts by weight. The adhesive was dissolved in 10-15 ml toluene per g. of mixture. The solution was applied to the surfaces to be

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The bonding of polyethylene ...

bonded whilst still hot, dried to produce films and the surfaces were then pressed together at 100 kg/cm^2, for 10-20 minuts, at 130-200°C. The degree of unsaturation of the polybutadiene was varied between 7 and 25 % and brass containing 65-75 % Cu was used. The bonding strengths, (50 - 100 kg/cm^2), were higher when 1,4 polybutadiene with lower degrees of unsaturation were used. Further improvements in the strength of adhesion are anticipated, as the high values reported in the present paper are said to be easy to obtain under far from ideal conditions. Research into brass-plating is now in progress to extend the above method to metals other than brass. Very good bonding to rubber was obtained, whose strength could not, however, be measured, since the rubber parted in preference to the joint. The bonding mechanism is briefly discussed. There are 1 table and 5 references: 3 Soviet-bloc and 2 non-Soviet-bloc. The references to English-language publications read as follows: I.D. Morron, India Rubber World, 98, 4, 35, 1938; H. I. Peters and W.H. Lockwood, Rubber World, 138, 3, 418, 1958

ASSOCIATION. Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: June 6, 1961

Card 2/2

YAKUBCHIK, A.I.; SHOSTATSKAYA, I.D.; SHIKHEYEVA, L.V.; VLASOVA, V.M.

Structure of 1, 3-butadiene polymers obtained in the presence of Ziegler-type catalysts. Zhur.prikl.khim. 35 no.4:876-880 Ap '62. (MIRA 15:4)

(Butadiene polymers)

32344
S/190/62/004/001/005/020
B101/B110

15.9201

AUTHORS: Tikhomirov, B. I., Yakubchik, A. I., Klopotova, I. A.

TITLE: Crystallinity of hydrogenation products of cis-1,4-polybutadiene

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 1, 1962, 25-29

TEXT: To study the dependence of the crystallinity on the hydrogenation degree of cis-1,4-polybutadiene (PB), the polymer was synthesized on a Ziegler catalyst. It contained 6% of 1,2- and 5% of trans-1,4 links. Propane-1,2,3-tricarboxylic acid was not contained in ozonolysis products. Nonoriented films 0.2 mm thick were obtained by fast evaporation of a 1% toluene solution of differently hydrogenated PB and the X-ray photograph of scattered radiation was recorded by a УРС-50И (URS-50I) apparatus with a Geiger counter. All samples with 6.5, 10.0, 28.5, 48.0, 54.1, and 70.5% nonsaturation showed scattering curves similar to those of polyethylene. The peaks occurring at the angles $2\theta = 21.4 \pm 0.2^{\circ}$ and $2\theta = 23.6 \pm 0.2^{\circ}$ were the same as those for polyethylene. Maxima which would correspond to the interplanar spacing of 1,4-cis-PB were not observed. Hence follows a

Card 1/3

Crystallinity of hydrogenation ...

structure comparable to that of polyethylene. The crystallization extent increased with increasing saturation: 20% with a 70.5%, 60% with a 6.5% unsaturated compound. The macromolecules of PB therefore consist of saturated and unsaturated links in random succession. The occurrence of saturated links does not noticeably change the molecular cross section and cohesion energy, but reduces the flexibility of chains, increases the interaction of links, elevates the melting point (30-110°C), and supports the regular packing of macromolecules in a three-dimensional lattice. The spherolitic structure was studied under an МП-6 (MP-6) polarization microscope. 0.1% solutions of hydrogenated PB in xylene were evaporated in vacuo, melted between the cover glasses at 150°C, and heated in a thermostat at 80-100°C for 15-20 min. Spherolites were only observed at a hydrogenation degree $\geq$ 50%. The formation of spherolites with a considerable content of unsaturated links may be explained by the packet theory of polymer structure proposed by V. A. Kargin, A. I. Kitaygorodskiy, G. L. Slonimskiy (Kolloidn. zh., 19, 131, 1957). There are 2 figures and 12 references: 6 Soviet and 6 non-Soviet. The three references to English-language publications read as follows: C. S. Marvel et al., J. Organ. Chem., 16, 838, 1951; S. L. Aggarwal, G. P. Tillej, J. Polymer Sci.,

Card 2/3

Crystallinity of hydrogenation ...

32311
S/190/62/004/001/005/020
B101/B110

18, 17, 1955; J. L. Matthews, H. S. Peiser, R. B. Richards, Acta crystallogr., 2, 85, 1949.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: January 16, 1961

X

Card 3/3

YAKUBCHIK, A.I.; SMIRNOVA, V.K.

Determining the content of 1, 2 links in piperylene rubber. Zhur.prikl. khim. 35 no.1:159-164 Ja '62. (MIRA 15:1)
(Piperylene) (Rubber, Synthetic)

34976
S/080/62/035/002/017/022
D258/D302

11.2140
11.2210

AUTHORS: Yakubchik, A. I., Smirnova, V. K. and Zavaley, V. M.

TITLE: Determining structure regularity in lithium-pentadiene rubber by the character of the 1,4-addition

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 2, 1962, 405-408

TEXT: The authors investigated the oxidation-decomposition products of Li-pentadiene rubber ozonide to establish the type of linkages formed during polyaddition. Chloroform solutions of the rubber were ozonized. The ozonides were dissolved in glacial acetic acid, decomposed with CH_3COOOH and yielded, on standing, acids in both crystalline and viscous states. The products were isolated and identified by distributive chromatography as methylsuccinic, dimethylsuccinic, succinic and acetic acids. These first 3 acids accounted for 38.1% of the carbon skeleton of the rubber, while 1,2 additions with propenyl groups were shown earlier to account for another 6.8%. The total of 38.1% breaks down into 23.9% of methyl-

Card 1/2

succinic acid formed by the breakdown of 1,4 - 1,4 additions: 6.2% of dimethylsuccinic acid from 1,4 - 4,1 additions; and 8.1% of succinic acid from 4,1 - 1,4 additions. There are 2 figures, 3 tables and 13 references: 5 Soviet-bloc and 8 non-Soviet-bloc. The references to the English-language publications read as follows: F. W. Staveley, Ind. Eng. Ch., 48, 778, (1956); H. Marshall and A. T. Cameron, Chem. Soc., 91, 1522, (1907).

SUBMITTED: May 5, 1961

Card 2/2

S/080/62/035/004/015/022
D244/D301

AUTHORS: Yakubchik, A. I., Shostatskaya, I. D., Shikheyeva, L. V. and Vlasova, V. M.

TITLE: Structure of butadiene - 1,3 polymers obtained in the presence of Ziegler type catalyst

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 4, 1962, 876-880

TEXT: The authors investigated butadiene - 1,3 polymers obtained in the presence of: $Al(C_2H_5)_2Cl + TiCl_4$ in the ratio of 3:1, and (2) $Al(iso\text{-}C_4H_9)_3 + TiCl_4$ in the ratio of 2:1. Attention was paid to the amount and distribution of the 1,2 and 1,4 bonds in the chains and the secondary reactions of branching and combination. The polymer samples were subjected to ozonolysis in methyl acetate solution and the acids obtained were separated by chromatography. The polymers obtained in the presence of the catalyst mixture had relatively evenly distributed 1,2 and 1,4 links in the macromolecules, as there were no acids with more than 3 carboxylic groups

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per molecule. The amount of 1,2 links varied within the limits 1.6-6.1%. There was no clear dependence of the amount of portions 1,4 - 1,2 - 1,4 on the conditions of polymerization. Also no branching was found for the α-methyl group in link 1,4, since the acids obtained did not contain 1,2,3 propanetricarboxylic acid. There are 1 figure, 5 tables and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: C. S. Marvel, J. Org. Ch., 16, 838, (1951).

SUBMITTED: February 6, 1961

S/080/62/035/008/009/009
D267/D308

AUTHORS: Yakubchik, A.I., and Smirnova, V.K.

TITLE: Structure of an irradiated piperylene polymer

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 8, 1962, 1870

TEXT: Piperylene was irradiated with gamma rays at room temperature at the rate of 0.72 roentgen/sec. The infrared spectrum disclosed that the polymer contained 6.5 % of 3,4 units (with vinyl groups) and 67 % of the trans- (1,4 + 1,2) units. An indirect method yielded the figure of 17.4 % for the 1,2 units (with propenyl groups). The emulsion polymer of piperylene contains nearly as much 1,2 units as the radiation polymer, but no 3,4 units. It is concluded that the polymer formed by irradiating piperylene, with gamma radiation, has an irregular structure.

SUBMITTED: June 1, 1961

Card 1/1

S/080/62/035/011/006/011
D287/D307

AUTHORS: Yakubchik, A.I., and Nikitina, V.D.

TITLE: The chemical structure of rubidium - divinyl polymers

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 11, 1962, 2491 - 2495

TEXT: Butadiene polymers were prepared in the presence of metallic rubidium at -5° and + 60°C by introducing 0.5 % fused rubidium, in a N_2-current, rapidly into tubes containing butadiene. Purified nitrogen was bubbled through the tubes, which were then sealed. The yields were 99 % for the polymer prepared at -5°C (polymer I) and 96 % for the polymer prepared at +60°C (polymer II). Polymer I had a low and polymer II a high degree of elasticity. The total unsaturation in polymer I was 87 % (identical to the unsaturation in Na-butadiene polymers). The percentage of 1,2-chains, determined by ozonolysis, was 49 % in polymer I and 42 % in polymer II. Total unsaturation in polymer II was not determined as the polymer was not completely soluble in CCl_4 or in $CHCl_3$. The ozonolysis products

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The chemical structure of ... S/080/62/035/011/006/011
D287/D307

were separated and characterized by chromatographic methods and it was found that Rb-butadiene polymers had the same structure as butadiene polymers which had previously been prepared in the presence of other metals (Na, K or Li). The -1,4 - 1,4-, -1,4 - 1,2 - 1,4-, -1,4-$(1,2)_2$-1,4- and 1,4 - 1,4-branching was on the α-methyl group. S.N. Sokolovskaya assisted in the experimental work. There are 1 figure and 3 tables.

SUBMITTED: July 8, 1961

Card 2/2

S/080/62/035/012/010/012
D204/D307

AUTHORS: Yakubchik, A.I. and Nikitina, V.D.

TITLE: The chemical structure of divinyl polymers obtained in the presence of butyllithium

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 12, 1962, 2749-2753

TEXT: The purpose of the present work was to determine the chemical structure of divinyl polymerized in the presence of LiBu (1 mole/1500 moles of divinyl), under strictly anhydrous conditions, at 16 and 80°C, in an atmosphere of O_2-free N_2 by studying both the proportions of the 1,2- and 1,4-linkages and the structures of portions formed from these links. The polymers were studied by treatment with ozone, oxidative fission of the ozonides, and chromatographic separation of the resulting acids (propionic, succinic, acetic, formic, 1,2,4-butametricarboxylic, 1,2,3-propanetricaroxylic, and 1,x,y,6-hexanetetracarboxylic). At 16°C, 55.3% of the carbon skeleton of the polymer contained 1,4-1,4 links and

Card 1/2

The chemical structure ... S/080/62/035/012/010/012
D204/D307

16.5% of the 1,4-1,2-1,4 links, at 80°C 44.7% of the carbon skeleton corresponded to 1,4-1,4, 30.8% to 1,4-1,2-1,4, and 2.2% to the $1,4-(1,2)_2-1,4$ links. These structures correspond to those obtained in the presence of various alkali metals, but the amount of 1,2 linkages was independent of temperature, while the proportion of 1,2 additions increased slightly at the higher temperature. V.I. Konovalova and M.K. Makeyev participated in the experimental part of this work. There are 3 figures and 2 tables.

SUBMITTED: July 8, 1961

Card 2/2

S/190/63/005/003/001/024
B101/B186

AUTHORS: Leonova, N. I., Tikhomirov, B. I., Yakubchik, A. I.

TITLE: Determination of the polybutadiene microstructure

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 3, 1963, 305-309

TEXT: A method of determining the content of 1,2-, cis-1,4 and trans-1,4 links in polybutadienes was developed on the basis of papers by D. Moreo (Chem. and Ind., 41, 758, 1959) and W. Kimmer, E. O. Schmalz (Rubber Chem. and Technol., 33, 639, 1960). For sodium butadiene containing no cis-1,4 links, and for its hydrogenation products dissolved in carbon disulfide, the absorption coefficient for 1,2 links at 911 cm^{-1} was found to be 286.8 $\pm$ 1.6 and for trans-1,4 links at 968 cm^{-1}, 255 $\pm$ 3.5 l/mole·cm. In the 968 cm^{-1} absorption band the superposition by neighboring absorption bands was taken into account. The content of 1,2 and trans-1,4 links in polybutadienes was determined with the aid of these absorption coefficients. The content of cis-1,4 links was calculated from the difference between the degree of insaturation determined by the addition of bromo iodine and the

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S/190/63/005/003/001/024
B101/B186

Determination of the...

cum of the 1,2 and trans-1,4 links. There are 2 tables.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: April 17, 1961

Card 2/2

YAKUBCHIK, A.I.; NIKITINA, V.D.; Prinimali uchastiye: KONOVALOVA, V.I.; MAKEYEV, M.K.

Chemical structure of bivinyl polymers obtained in the presence of butyllithium. Zhur.prikl.khim. 35 no.12:2749-2753 D '62. (MIRA 16:5)

(Butadiene) (Lithium) (Polymerization)

LEONOVA, N.I.; TIKHOMIROV, B.I.; YAKUBCHIK, A.I.; Prinimala uchastiye MIKHAYLOVA, L.N.

Determination of the microstructure of polybutadienes. Vysokom.soed. 5 no.3:305-308 Mr '63. (MIRA 16:3)

1. Leningradskiy gosudarstvennyy universitet.
(Butadiene polymers)

YAKUBCHIK, A.I.; SMIRNOVA, V.K.

Structure of piperylene polymers obtained in the presence of complex catalysts. Zhur.prikl.khim. 36 no.1:156-160 Ja '63. (MIRA 16:5)
(Piperylene) (Polymerization) (Catalysts)

L 17763-63 EPR/EPF(c)/EWP(t)/EWT(m)/EDS/ES(s)-2 AFFTC/ASD/SSD Ps-4/Pc-4/

ACCESSION NR: AP3006185 Pr-4/Pt-4 RM/WW 8/0080/63/036/007/1584/1587

77

AUTHORS: Yakubchik, A. I.; Shagov, V. S.

TITLE: The stability of some polyaldehydes

SOURCE: Zhurnal prikladnoy khimii, v. 36, no. 7, 1963, 1584-1587

TOPIC TAGS: polyaldehyde, acetic alehyde, trichloracetic aldehyde, hexahydrobenzoin aldehyde, thermostability

ABSTRACT: To study the possible effect of the substituent in the monomer aldehyde on the thermostability of polyaldehydes, the authors compared the behavior of polymers of acetic, trichloracetic, and hexahydrobenzoic aldehydes at 100C. Polymer weight decrement on heating was used as the measure of thermostability, with the results shown in the table in the Enclosure. The hexahydrobenzoic aldehyde polymer was the most resistant to heat, the amorphous polymer of acetic aldehyde, the least resistant. The crystalline polymers were more thermostable than the amorphous or less highly crystalline polymers, degree of crystallinity being more significant for thermostability than molecular weight. At 100C, polyaldehyde break-down is due primarily to deformation occurring at the end of the

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L 17763-63

ACCESSION NR: AP3006185

chain, the stability of which is determined in part by the substituent. Orig. art. has: 3 figures, 1 table.

ASSOCIATION: None

SUBMITTED: 01Feb62 DATE ACQ: 25Sep63 ENCL: 00

SUB CODE: CH NO REF SOV: 001 OTHER: 016

2/2

Card

YAKUBCHIK, A.I.; TIKHOMIROV, B.I.; KLOPOTOVA, I.A.; MIKHAYLOVA, L.N.

Hydrogenation of cis-1,4-polybutadiene in the presence of soluble catalysts. Dokl. AN SSSR 161 no.6:1365-1367 Ap '65. (MIRA 18:5)

1. Leningradskiy gosudarstvennyy universitet im. A.A.Zhdanova. Submitted October 15, 1964.

L 4142-65 EPA(s)-2/EWT(m)/EPF(c)/EPR/EWP(j)/T Pc-4/Pr-4/Ps-4/Pt-10 RPL

ACCESSION NR: AT4043845

AUTHOR: Yakubchik, A. I., Shagov, V. S.; Mikhaylova, Z. V.

TITLE: Some reactions of the hemiacetal terminal groups of acetaldehyde polymers

SOURCE: Khimicheskiye svoystva i modifikatsiya polimerov (Chemical properties and the modification of polymers); [illegible] Moscow, Izd-vo Nauka, 1964, 102-105

TOPIC TAGS: acetaldehyde polymer, trimethylbromomethane, triphenylchloromethane, acrolein, allyl alcohol, acrylonitrile, isoprene, infrared spectroscopy, hydroxyl group, hemiacetal group, polyaldehyde

ABSTRACT: [illegible]

Card 1/3

L 34142-65
ACCESSION NR: AT4049846

described in detail. The intrinsic viscosity and thermal stability of the polymers were determined and tabulated [illegible] with acetic anhydride, that polymers were acetylated [illegible] initial polymers. Optimum results [illegible] days. At 20C the molecular weight [illegible] and the polymer undergoes no degradation. The infrared spectra of the acetylated polymer showed a sharp band at 1720 cm^{-1} characteristic of the C=O group. The bands characteristic [illegible] hydroxyl groups were missing. The reactions with trimethylbromomethane [illegible] methane showed that [illegible] hydroxyl groups are substituted by ether groups. Polymers with these end groups (where R = CH_3 or C_6H_5) are more stable than the initial polymers; trimethylbromomethane gives a more stable [illegible] methane. Infrared [illegible] characteristic [illegible] bromomethane [illegible]

Tabulated data show that by precipitating the polymer [illegible] sodium bicarbonate, its stability is increased. The stabilizing effect [illegible] Na

Card 2/3

bicarbonate is explained by the fact that ... binds the ... present in the polymer and thus ... the polymer.

is used ... hydroxyl terminal groups of acetic ... CH_2OH, CN and CH ... groups increases the thermal stability of these polymers considerably. Orig. art. has: 3 tables and 4 formulas.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University)

SUBMITTED: 28Jun62 ENCL: 00 SUB CODE: OC

NO REF SOV: 001 OTHER: 009

Card 3/3

YAKUBCHIK, A.I.; TIKHOMIROV, B.I.; MIKHAYLOVA, L.N.

Chemical inhomogeneity of the heterogenous catalytic hydrogenation products of sodium polybutadiene. Vysokom. soed. 7 no.9: 1562-1564 S '65. (MIRA 18:10)

1. Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova.

SHIROKOVA, M.N.; YAKUBCHIK, A.I.

Ozonization of polymeric Schiff bases from benzyl and p-phenylenediamine. Vysokom. soed. 7 no.9:1641-1644 S '65. (MIRA 18:10)

1. Leningradskiy gosudarstvennyy universitet.

YAKUBCHIK, B.I.

Use of some individual differer ›s in the activities of athlete-acrobats during training. Vop. psikhol. no.5:20-30 S-O '64 (MIRA 18:1)

1. Kazanskiy pedagogicheskiy institut i Kazanskiy universitet.

YAKUBCHIK, F.M.

Clinical aspects of neuroblastoma of the adrenals. Probl. endok. i gorm. 6 no. 4:111-113 Jl-Ag '60. (MIRA 14:1)
(ADRENAL GLAND--TUMORS)

YAKUBCHIK, F.M., kand.med.nauk

Use of the preparation thiotef in some diseases in children. (MIRA 14:9)
Pediatriia no.7:37-40 '61.

1. Iz Leningradskogo pediatricheskogo meditsinskogo instituta (dir. - prof. N.T. Shutova) gospital'noy pediatrii (zav. - deystvitel'nyy chlen AMN SSSR prof. A.F. Tur).
(PHOSPHOROTHIOIC ACID—THERAPEUTIC USE)
(CHILDREN—DISEASES)

L 4096-66 EWT(1)/EWA(h) GK

ACC NR: AP5024994 SOURCE CODE: UR/0286/65/000/016/0058/0058

44
B

INVENTOR: Sestroretskiy, B. V.; Yakuben', L. M.; Sin'kov, Yu. A.

ORG: none

TITLE: Shf semiconductor switching element [25] Class 21, No. 173849

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 16, 1965, 58

TOPIC TAGS: electronic switch, switching circuit, superhigh frequency

ABSTRACT: This Author Certificate introduces an shf semiconductor switching element (see Fig. 1) with three leads. The middle lead serves to supply signals. In order

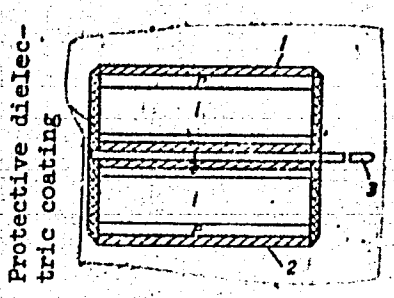

Fig. 1. Shf semiconductor switching element

1 and 2 - Metal contacts with P-windings; 3 - middle lead.

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UDC: 621.382.233:
621.372.837

L 4096-66

ACC NR: AP5024994

to increase the range of operation at pulses of up to 10^4 w, the element is built in the form of a nipin structure. Orig. art. has: 1 figure. [JR]

SUB CODE: EC/ SUBM DATE: 04Feb64/ ORIG REF: 000/ OTH REF: 000/ ATD PRESS: 4129

BVK
Card 2/2

YAKUBEN', M.

GRIGOR'YEV, V. (Rostovskaya obl.); LESNICHENKO, P. (L'vovskaya obl.); YAKUBEN', M. (Moskovskaya obl.); KITOV, P. (Khar'kovskaya obl.); KORNEV, V. (Mytishchinskiy radiouzel); BRATANOVSKIY, B. (Pavlovo-Posadskiy radiouzel).

Our complaints against the radio industry. Radio no.9:9 S '54. (MLRA 7:9)

1. Nachal'niki DRTS (for Grigor'yev, Lesnichenko, Yakuben', Kutov)
2. Nachal'niki radiouzlov Voskovskoy oblasti (for Kornev & Bratanovskiy) (Radio industry)

L 43011-65

ACCESSION NR: AP5008682 S/0077/65/010/002/0103/0107

AUTHORS: Barskiy, I. Ya.; Yakubenas, V. A. V.; Lovina, V. V.

TITLE: Study of the occurrence of non-interchangeability of photographic materials in the ultra-violet region of the spectrum

SOURCE: Zhurnal nauchnoy i prikladnoy fotografii i kinematografii, v. 10, no. 2, 1965, 103-107

TOPIC TAGS: ultraviolet light, ultraviolet spectra region photography, photographic materials, film [illegible], film A 500, sensitometer FSR 8, mercury lamp DRSh 1000, film panchromo 1, micrometer

ABSTRACT: The authors conducted a study of the occurrence of noninterchangeability of photographic materials in various regions of the visible and ultraviolet spectra. Sensitometric device FSR-8 was used in obtaining characteristic curves [illegible] illumination was in the form of a high pressure

(10-2 to 100 seconds). Photographic [illegible]

Card 1/2

ACCESSION NR: AP5006682

micrometer MF-2. Iso-opaque curves were plotted versus exposure duration on
[illegible] for several photographic materials and at varying illumination

[illegible] In. S. I. Various Stars

[illegible]

SUBMITTED: 07Mar64 ENCL: 02 SUB CODE: ES

[illegible] OTHER: 003

Card 2/4

SHARF, V.Z.; FREYDLIN, L.Kh.; OPARINA, G.K.; KHEYFETS, V.I.; BYCHKOVA, M.K.; KOPYLEVICH, G.M.; YAKUBENOK, V.V.

Production of isoprene from formaldehyde and isobutylene via 3-methyl-1,3-butanediol. Izv. AN SSSR. Ser. khim. no.9:1663-1665 '65. (MIRA 18:9)

1. Institut organicheskoy khimii im. N.D. Zelinskogo AN SSSR i Opytno-konstruktorskoye byuro sinteticheskikh produktov Priokskogo soveta narodnogo khozyaystva, Tula.

YAKUBENKO, A.; DZHALALBEKOVA, L.A., redaktor; KISKLEV, Yu.N., redaktor; SOSLENNIKOVA, N.M., tekhnicheskiy redaktor

[What is appetite; stories about digestion] Chto takoe appetit; rasskazy o pishchevarenii. Moskva, Gos.izd-vo detskoi lit-ry Ministerstva prosveshchenia RSFSR, 1953. 158 p. (MLRA 8:10)
(DIGESTION) (APPETITE)

YAKUBENKO, A.

Work with a future. Prof.-tekh.obr. 19 no.4:19-20 Ap '62. (MIRA 15:4)

1. Ministerstvo vysshego, srednego spetsial'nogo i professional'nogo obrazovaniya Belorusskoy SSR.
(White Russia—Evening and construction schools)

YAKUBENKO, A.

Closer to the needs of industry. Prof.-tekh.obr. 19 no.2:4 F '62. (MIRA 15:2)
(Farm mechanization--Study and teaching)

YAKUBENKO, A.

Specialization in rural schools. Prof.-tekh. obr. 22 no.1: 13 Ja '65. (MIRA 18:4)

1. Zamestitel' nachal'nika Upravleniya professional'no-tekhnicheskogo obrazovaniya Belorusskoy SSR.

YAKUBENKO, A.A.

BARSHTEYN, I.K., kandidat tekhnicheskikh nauk.;RUBIN, M.M., kandidat tekhnicheskikh nauk.;SIZIN, N.R., inzhener.;SHAMRAYEVSKIY, I.M.; inzhener.;SHUTOV, V.I., inzhener.;YAKUBENKO, A.A., inzhener.

Adjustment and investigation of TP-230-3 boilers with slag-tap furnaces. Elek. sta 27 no.10:4-12 O '56. (MLRA 9:12)
(Boilers)

VNUKOV, A.K., inzh.; YAKUHENKO, A.A., inzh.

Drying boiler linings. Elek.sta. 29 no.1:89 Ja '58. (MIRA 11:2)
(Boilers--Drying)

TITOV, Vasiliy Alekseyevich; kand.tekhn. nauk; YAKUBENKO, Arnol'd Romanovich, inzh.; SHOBIK, L.Ye., inzh., ved. red.; SHREYDER, A.V., kand. tekhn. nauk, red.; SOROKINA, T.M., tekhn. red.

[Effectiveness of steel protection against corrosion by various methods of oxidation]Effektivnost' zashchity stali ot korrozii razlichnymi metodami oksidirovaniia. Moskva, Filial Vses. in-ta nauchn. i tekhn. informatsii, 1958. 14 p. (Peredovdi nauchno-tekhnicheskii i proizvodstvennyi opyt. Tema 13. No.M-58-108/11) (MIRA 16:3)

(Steel--Corrosion) (Metallic films)